

What is claimed is:

1. A two-piece, two-stage, reduced energy mechanically-operating cartridge for launching a projectile from a dedicated or modified firearm, comprising:

(a) a piston sleeve comprising a piston sleeve jacket defining a projectile cavity at a first longitudinal end for coupling the projectile therein, and the second end for coupling with a primary case, and the piston sleeve including one or more partially annular protrusion portions (hereinafter "cogs"); and

(b) the primary case comprising a primary case jacket for being axially coupled with the second end of the piston sleeve, and including one or more complementary cogs to those of the piston sleeve, and defining a primary case cavity for coupling with a propellant mechanism, and

(c) wherein an axial coupling of the primary case with the second end of the piston sleeve involves the respective cogs of the primary case and piston sleeve being initially offset, and

(c) wherein upon the axial coupling of the piston sleeve and primary case and at least partial compression together, the primary case and the piston sleeve become relatively rotationally movable to angularly overlap their respective cogs, the angular overlap being present when the sleeve and primary case are set into an at least partially compressed position, such that upon activation, when the piston sleeve and primary case telescope from the static position, the respective cogs meet at a particular longitudinal extent of the cartridge, and

(d) wherein if propellant is manipulated creating an overcharging then piston sleeve will separate from primary case via a sheering action of the cogs releasing excessive energy preventing projectile of traveling at excessive velocity.

2. The cartridge of claim 1, the cogs of the piston sleeve comprising two or more spaced apart cogs.

3. The cartridge of claim 2, wherein the piston sleeve further comprises channels between the cogs for mating with the complementary cogs of the primary case.

4. The cartridge of claim 3, wherein the channels of the piston sleeve slidably couple with the complementary cogs.
5. The cartridge of claim 1, wherein the cogs of the piston sleeve comprise three or more spaced apart cogs.
6. The cartridge of claim 5, wherein the piston sleeve further comprises channels between the cogs for mating with the complementary cogs of the primary case.
7. The cartridge of claim 6, wherein the channels of the piston sleeve slidably couple with the complementary cogs of the primary case.
8. The cartridge of claim 1, wherein the firearm includes an annular step between the chamber and the barrel, such that upon activation when the piston sleeve and primary case are telescoping from the static position, a shoulder of the piston sleeve contacts the annular step preventing the sleeve from advancing down the barrel, and instead the primary case thrusts rearward away from the barrel.
9. The cartridge of claim 8, wherein the piston sleeve and the primary case include a complementary annular protrusion and annular groove pair, in addition to said cogs and said channels, for coupling together to axially stabilize the coupling of the piston sleeve and the primary case in the static position.
10. The cartridge of claim 1, wherein the piston sleeve and the primary case include a complementary annular protrusion and annular groove pair, in addition to said cogs and said channels, for coupling together to axially stabilize the coupling of the piston sleeve and the primary case in the static position.
11. The cartridge of claim 1, wherein the jacket of the piston sleeve comprises a substantially non-deformable material, such that the piston sleeve jacket is reusable.

12. The cartridge of claim 11, wherein the jacket of the primary case also comprises a substantially non-deformable material, such that the primary case jacket is reusable.

13. The cartridge of claim 1, wherein the propellant mechanism comprises a detonating primer or a pressurized propellant container.

14. The cartridge of claim 1, a regulator hole being further defined between the primary case and bullet cavities of selected size for regulating a velocity of the projectile upon firing.

15. The cartridge of claim 14, wherein the regulator hole comprises an adjustable valve for regulating propellant pressure to launch projectile at a determined velocity.

16. The cartridge of claim 14, wherein the regulator hole comprises a device to open or close pending need to regulate pressure passing through flash hole to regulate projectile velocity.

17. The cartridge of claim 1, wherein the axial coupling involves the second end of the piston sleeve overlapping the primary case.

18. A two-piece, two-stage, reduced energy, mechanically operating cartridge of reusable components for launching a bullet of non-lethal, sub-lethal or lethal composition from a dedicated or modified firearm including an annular step at the interface between the chamber and the barrel, comprising:

(a) a piston sleeve comprising a substantially non-deformable reusable jacket defining a bullet cavity at a first longitudinal end for coupling the non-lethal bullet therein, and the second end for coupling with a primary case;

(b) the primary case comprising a substantially non-deformable reusable jacket for being axially coupled with the second end of the piston sleeve, and defining a primary case cavity for coupling with a propellant mechanism;

(c) complementary pairs of partially annular protruding portions (hereinafter “cogs”) and channels for coupling the piston sleeve with the primary case, and

(d) wherein upon activation when the piston sleeve and primary case are telescoping apart from a static position, a shoulder of the piston sleeve contacts the annular step of the firearm preventing the sleeve from advancing down the barrel, and instead the primary case thrusts rearward away from the barrel.

19. The cartridge of claim 18, wherein the piston sleeve and the primary case include a complementary annular protrusion and annular groove pair, in addition to the cogs and channels, for coupling together to axially stabilize the coupling of the piston sleeve and the primary case in the static position.

20. The cartridge of claim 18, wherein the propellant mechanism comprises a detonating primer or a pressurized propellant container.

21. The cartridge of claim 18, a regulator hole being further defined between the primary case and projectile cavities of selected size for regulating a velocity of the projectile upon firing.

22. The cartridge of claim 21, wherein the regulator hole comprises an adjustable valve for regulating propellant pressure to launch projectile at a determined velocity.

23. The cartridge of claim 22, wherein the regulator hole comprises a device to open or close pending need to regulate pressure passing through flash hole to regulate projectile velocity.

24. The cartridge of claim 18, wherein the axial coupling involves the second end of the piston sleeve overlapping the primary case.

25. A two piece, two stage, reduced energy mechanically operating cartridge for launching a projectile of non-lethal, sub-lethal or lethal composition from a dedicated or modified firearm, comprising:

(a) a piston sleeve comprising a jacket defining a projectile cavity at a first longitudinal end for coupling the projectile therein, and the second end for coupling with a primary case; and

(b) the primary case comprising a jacket for being axially coupled with the second end of the piston sleeve, and defining a primary case cavity for coupling with a propellant mechanism,

(c) wherein the piston sleeve and the primary case include a complementary annular protrusion and annular groove pair for coupling together to axially stabilize the coupling of the piston sleeve and the primary case in a static position, wherein upon activation, the piston sleeve and primary case telescope apart from the static position.

26. The cartridge of claim 25, wherein the jacket of the piston sleeve comprises a substantially non-deformable material, such that the piston sleeve jacket is reusable.

27. The cartridge of claim 26, wherein the jacket of the primary case also comprises a substantially non-deformable material, such that the primary case jacket is reusable.

28. The cartridge of claim 25, wherein the propellant mechanism comprises a detonating primer or a pressurized gas container.

29. The cartridge of claim 25, a regulator hole being further defined between the primary case and projectile cavities of selected size for regulating a velocity of the projectile upon activation.

30. The cartridge of claim 29, wherein the regulator hole comprises an adjustable valve for regulating propellant pressure to launch projectile at a determined velocity.

31. The cartridge of claim 29, wherein the regulator hole comprises a device to open or close pending need to regulate pressure passing through flash hole to regulate projectile velocity.

32. The cartridge of claim 25, wherein the axial coupling involves the second end of the piston sleeve overlapping the primary case.

33. The cartridge of claim 25, further comprising complementary pairs of partially annular ridge portions (hereinafter "cogs") and channels, in addition to said annular protrusion and annular groove pair, for coupling the piston sleeve with the primary case, and

34. A two piece, two stage, reduced energy mechanically operating cartridge of reusable components for firing a projectile of non-lethal, sub-lethal or lethal composition from a dedicated or modified firearm, comprising:

(a) a piston sleeve comprising a substantially non-deformable jacket defining a projectile cavity at a first longitudinal end for coupling the projectile therein, and the second end for coupling and decoupling with a primary case; and

(b) the primary case comprising a substantially non-deformable jacket for being axially coupled and decoupled with the second end of the piston sleeve, and defining a primary case cavity for coupling with a propellant mechanism,

(c) wherein upon activation, the piston sleeve and primary case telescope apart from a static position, and

(d) wherein the piston sleeve and primary case, having not substantially deformed during the firing, comprise reduced energy, mechanically-operating cartridge components that are configured for coupling and decoupling, and are reloadable with another projectile and rechargeable with another propellant mechanism, respectively, for reuse.

35. The cartridge of claim 34, wherein the piston sleeve includes one or more partially annular protrusion portions (hereinafter "cogs") and the primary case includes one or more complementary cogs to those of the piston sleeve, and wherein an axial coupling of the

primary case with the second end of the piston sleeve involves the respective cogs of the primary case and piston sleeve being offset and the sleeve and case being relatively axially moved and brought together, and wherein upon the axial coupling of the piston sleeve and primary case and at least partial compression together as to their combined longitudinal extent, the primary case and the piston sleeve become relatively rotationally movable to angularly overlap their respective cogs, the angular overlap being present when the sleeve and primary case are set into a fully compressed, static position, such that upon firing, when the piston sleeve and primary case telescope from the static position, the respective cogs meet at a particular longitudinal extent of the cartridge.

36. The cartridge of claim 35, wherein if propellant is manipulated creating an overcharging then piston sleeve will separate from primary case via a sheering action of the cogs releasing excessive energy preventing projectile of traveling at excessive velocity.

37. The cartridge of claim 35, wherein the firearm includes an annular step between the chamber and the barrel, such that upon firing when the piston sleeve and primary case are telescoping from the static position, a shoulder of the piston sleeve contacts the annular step preventing the sleeve from advancing down the barrel.

38. The cartridge of claim 37, wherein the piston sleeve and the primary case include a complementary annular protrusion and annular groove pair, in addition to the cogs and channels, for coupling together to axially stabilize the coupling of the piston sleeve and the primary case in the static position.

39. The cartridge of claim 35, wherein the piston sleeve and the primary case include a complementary annular protrusion and annular groove pair, in addition to the cogs and channels, for coupling together to axially stabilize the coupling of the piston sleeve and the primary case in the static position.

40. The cartridge of claim 34, wherein the firearm includes an annular step between the chamber and the barrel, such that upon firing when the piston sleeve and primary case are telescoping from the static position, a shoulder of the piston sleeve contacts the annular step preventing the sleeve from advancing down the barrel, and instead the primary case thrusts rearward away from the barrel.

41. The cartridge of claim 40, wherein the piston sleeve and the primary case include a complementary annular protrusion and annular groove pair, in addition to the cogs and channels, for coupling together to axially stabilize the coupling of the piston sleeve and the primary case in the static position.

42. The cartridge of claim 34, wherein the piston sleeve and the primary case include a complementary annular protrusion and annular groove pair, in addition to the cogs and channels, for coupling together to axially stabilize the coupling of the piston sleeve and the primary case in the static position.

43. The cartridge of claim 34, wherein the piston sleeve defines a second cavity at an opposite longitudinal end from the cavity for fitting the projectile therein, the second cavity for receiving the primary case.

44. The cartridge of claim 34, wherein the projectile is configured such that more than half of the exposed length of the projectile, which is exposed outside the cavity of the piston sleeve when loaded, includes a substantially right cylindrical shape.

45. The cartridge of claim 34, wherein the projectile cavity and the projectile couple in part due to retention protrusions protruding inward from the sleeve or outward from the projectile or both.

46. The cartridge of claim 34, wherein the propellant mechanism comprises a primer cartridge, and the primary case cavity and the propellant mechanism couple in part due to



retention protrusions protruding inward from the primary case or outward from the primer cartridge, or both.

47. The cartridge of claim 34, wherein the propellant mechanism comprises a detonating primer or a pressurized propellant container.

48. The cartridge of claim 34, a regulator hole being further defined between the primary case and projectile cavities of selected size for regulating a velocity of the projectile upon firing.

49. The cartridge of claim 48, wherein the regulator hole comprises an adjustable valve for regulating propellant pressure to launch projectile at a determined velocity.

50. The cartridge of claim 48, wherein the regulator hole comprises a device to open or close pending need to regulate pressure passing through flash hole to regulate projectile velocity.

51. The cartridge of claim 34, wherein the axial coupling involves the second end of the piston sleeve overlapping the primary case.

52. A method of preparing a two-piece, two-stage, reduced energy, loaded and charged non-lethal, sub-lethal, or lethal, mechanically operating cartridge including a piston sleeve and a primary case, comprising:

(a) loading a projectile of non-lethal, sub-lethal or lethal composition into a cavity defined within the piston sleeve;

(b) coupling a propellant mechanism within a cavity defined within the primary case;

(c) axially coupling the piston sleeve with the primary case including an initial relative axial displacement of the sleeve and the base to bring them together, wherein partially annular protrusions (hereinafter "cogs") are coupled with channels between complementary cogs of the sleeve and the base during the initial axial displacement; and

(d) relatively rotating the sleeve and the base after the initial axial displacement such as to prevent direct axial separation, wherein the channels extend angularly such that cogs of each of the sleeve and the base are angularly overlapped after the relative rotational displacement.

53. The method of claim 52, wherein if propellant is manipulated creating an overcharging, then the method further comprises separating the piston sleeve from primary case via a sheering action of the cogs releasing excessive energy preventing projectile of traveling at excessive velocity.

54. The method of claim 52, wherein the piston sleeve comprises a substantially non-deformable jacket, the method further comprising reloading another projectile into the cavity defined within the piston sleeve for reuse.

55. The method of claim 54, wherein the primary case comprises a substantially non-deformable jacket, the method further comprising coupling another propellant mechanism with the cavity defined within the primary case for reuse of the primary case.

56. The method of claim 52, wherein the primary case and piston sleeve comprise substantially non-deformable jackets, the method further comprising repeating the projectile loading or propellant mechanism coupling, or both, with another projectile or another propellant mechanism, or both, respectively, and repeating the coupling and rotating steps for reuse of the primary case or piston sleeve, or both.

57. The method of claim 56, wherein the sleeve and primary case of the two-piece cartridge of the reuse step are reused, respectively, with a different reusable primary case and a different reusable sleeve.

58. The method of claim 56, wherein the same piston sleeve and primary case of the two-piece cartridge of the reuse step are reused together.

59. The method of claim 52, further comprising firing the cartridge within a chamber of a dedicated or modified firearm, wherein upon firing, the piston sleeve and primary case telescope apart from a static position.

60. The method of claim 59, wherein the firearm includes an annular step between the chamber and the barrel, such that upon firing when the piston sleeve and primary case are telescoping from the static position, a shoulder of the piston sleeve contacts the annular step preventing the sleeve from advancing down the barrel, and instead the method comprises thrusting the primary case rearward.

61. The method of claim 52, wherein the piston sleeve and the primary case include a complementary annular protrusion and annular groove pair, in addition to the cogs and channels, the method further comprising coupling the annular protrusion-annular groove pair together to axially stabilize the coupling of the piston sleeve and the primary case in the static position.

62. The method of claim 52, wherein the propellant mechanism comprises a detonating primer or a pressurized gas container.

63. The method of claim 52, a regulator hole being further defined between the primary case and projectile cavities of selected size, the method comprising regulating with the regulator hole a velocity of the projectile upon activation.

64. The method of claim 63, the regulator hole comprising a valve, and the method further comprising adjusting the valve for regulating propellant pressure to launch projectile at a determined velocity.

65. The method of claim 63, the regulator hole comprises a device, the method comprises opening or closing pending need to regulate pressure passing through flash hole to regulate projectile velocity.

66. A method of preparing a two-piece, two stage, reduced energy, loaded and charged non-lethal, sub-lethal or lethal, mechanically operating cartridge of reusable components including a piston sleeve and a primary case, comprising:

- (a) loading a projectile of non-lethal, sub-lethal or lethal composition into a cavity defined within the piston sleeve;
  - (b) loading a propellant mechanism into a cavity defined within the primary case;
  - (c) coupling the primary case and the piston sleeve together to form a cartridge;
  - (d) de-coupling the primary case and piston sleeve after discharging the cartridge;
- and
- (e) repeating the projectile loading or propellant mechanism coupling, or both, respectively, with another projectile or another propellant mechanism, or both, and repeating the coupling for reuse of the piston sleeve or primary case, or both.

67. The method of claim 66, wherein the piston sleeve and primary case of the two-piece cartridge of the repeating step are reused, respectively, with a different reusable primary case and a different reusable piston sleeve.

68. The method of claim 66, wherein the piston sleeve and primary case of the two-piece cartridge of the repeating step are reused together.

69. The method of claim 66, further comprising firing the cartridge within a chamber of a dedicated or modified firearm, wherein upon firing, the piston sleeve and primary case telescope apart from a static position.

70. The method of claim 69, further comprising:

- (i) axially coupling the piston sleeve with the primary case including an initial relative axial displacement of the sleeve and the base to bring them together, wherein cogs are coupled with channels between complementary cogs of the sleeve and the base during the initial axial displacement; and
- (ii) relatively rotating the sleeve and the base after the initial axial displacement such as to prevent direct axial separation, wherein the channels extend angularly such

9 that cogs of each of the sleeve and the base are angularly overlapped after the relative rotational displacement.

71. The method of claim 70, wherein if propellant is manipulated creating an overcharging, then the method further comprises separating the piston sleeve from primary case via a sheering action of the cogs releasing excessive energy preventing projectile of traveling at excessive velocity.

72. The method of claim 69, wherein the firearm includes an annular step between the chamber and the barrel, such that upon firing when the piston sleeve and primary case are telescoping from the static position, a shoulder of the piston sleeve contacts the annular step preventing the sleeve from advancing down the barrel, and instead the method comprises thrusting the primary case rearward away from the barrel.

73. The method of claim 66, wherein the piston sleeve and the primary case include a complementary annular protrusion and annular groove pair, in addition to the cogs and channels, the method further comprising coupling the annular protrusion-annular groove pair together to axially stabilize the coupling of the piston sleeve and the primary case in the static position.

74. The method of claim 66, wherein the propellant mechanism comprises a detonating primer or a pressurized gas container.

75. The method of claim 66, wherein the repeating includes repeating the propellant mechanism coupling for reuse of the primary case.

76. The method of claim 66, a regulator hole being further defined between the primary case and projectile cavities of selected size, the method comprising regulating with the regulator hole a velocity of the projectile upon activation.

77. The method of claim 76, the regulator hole comprising a valve, and the method further comprising adjusting the valve for regulating propellant pressure to launch projectile at a determined velocity.

78. The method of claim 76, the regulator hole comprises a device, the method comprises opening or closing pending need to regulate pressure passing through flash hole to regulate projectile velocity.